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ABSTRACT

In this paper, the steps implemented by the National Institutes of Health (NIH) and the National Science Foundation (NSF) to upgrade the quality of the 1973 Graduate Science Student Support Survey are cited. Changes which were incorporated into the survey were intended to increase the scope and accuracy of data collected. To verify the coverage, a list of the institutions that made up the population surveyed in 1973 was compared with lists of Ph.D.-granting institutions maintained by federal agencies and professional associations with an interest in higher education. Discripancies were checked by telephone inquiry and adjustments in the survey base were made. The second major component of the study was to reconstruct the 1973 survey responses from departmental records for a sample of departments and to compare the resulting data with that which had been reported by the department. Also, selected student interviews were held in order to make comparisons with departmental records. (Author/CP)

THE QUALITY ASSESSMENT OF THE 1973 SURVEY OF GRADUATE SCIENCE STUDENT SUPPORT SURVEY

by:

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INTRODUCTION

I would like to review with you today the steps implemented by NSF and NIH in the 1973 GSSS Survey for the purpose of upgrading the quality of this study. I will discuss one of these steps, the quality assessment study, in some depth, giving methodology employed, findings, and resulting recommendations.

The 1973 survey was designed by NSF and NIH to include an examination of the coverage of institutions and departments to assess its adequacy and to develop a tool for expanding coverage to encompass the entire population. The work accomplished during the 1973 survey year also included the development of a Quick Response Survey, which was designed to collect a limited set of graduate student enrollment characteristics from a sample of departments, use this data for projecting changes in national graduate enrollment for major areas of science and engineering, and make the information on these changes available to users several months prior to publication of the final survey statistics.

NSF and NIH also formed an advisory panel made up of both suppliers and users of the GSSS Survey data. This advisory panel was convened twice to review progress on the 1973 survey and give us the benefit of their thoughts regarding the existing survey methods, instruments, analysis and publication plans.

In addition, NSF and NIH provided for the collection of data to be used in the assessment of the quality of the survey data. This quality assessment study had two major components. The first involved the collection of enrollment and student characteristic data from a sample of departments which was to be compared with that reported by the departments in their 1973 survey response. The second component involved a brief telephone interview with a sample of graduate students and postdoctorals so that their enrollment characteristics and sources of support could be determined. This data was compared with that obtained from

department records for the same students. This provided some insights into the consistency of the students' perceptions and the department records.

I would like to discuss with you the methodology employed in each of these study components, and to present the principal findings.

COVERAGE

There were two aspects to the investigation of coverage. These dealt with coverage of institutions, and the adequacy of coverage of departments within the institutions.

As you probably know, the GSSS Survey population is comprised of all institutions, both public and private, that have at least one Ph.D. program in science or engineering. All science and engineering departments within an eligible institution that have graduate programs offering a masters or doctorate degree are asked to respond to the survey. A list of the institutions that made up the population surveyed in 1973 was compared with lists of Ph.D. granting institutions maintained by Federal agencies and professional associations with an interest in higher education. Institutions which did not appear in the 1973 GSSS survey population, but which appeared to be eligible for inclusion, were contacted by telephone. If it was established that an institution was eligible, we obtained a copy of their graduate school catalog. These catalogs were then reviewed, and a list of the departments offering graduate programs was compiled. These lists were then forwarded to the graduate deans with a request that they review and modify the list to include all departments that had graduate programs. By using these procedures, 14 institutions that were eligible for inclusion in the survey population, but which had not been included, were identified. The 14 institutions contained a total of 102 departments with graduate programs, with the departments representing less than 2 percent of the number that had responded to the 1973 survey.

The investigation of the coverage of departments was conducted by developing a "universe of eligible departments", which was accomplished by using the 1973 survey response and the graduate school catalog for each respondent institution. The catalog review revealed, together with the universe of departments in medical schools furnished by NIH, 7,876 science and engineering departments. Responses were received from 6,559 departments on the 1973 GSSS Survey. The difference of 1,317 departments is approximately 20 percent of those responding to the survey. To estimate the number of full-time graduate students who are enrolled in these 1,317 departments, average enrollment was determined for 52 areas of science and engineering departments. Applying these averages to the 1,317 "eligible but missing" departments one obtains an estimate of undercoverage of 30,072 full-time graduate students. This represents 18.3 percent of the 164,318 counted in the 1973 survey. These estimates of departmental and student undercoverage are considered possibly to be seriously inflated. It is felt that catalogs tend to overstate program offerings, and a sound argument can be made that the "eligible but missing" departments would tend to have smaller enrollment than the 1973 survey averages. The "eligible but missing" departments probably tend to be the smaller, newer, and less visible departments. Experience gained in the next few years by using the "universe of eligible departments" generated from catalogs will provide a more definitive assessment of the usefulness of catalogs for this purpose.

DEPARTMENTAL RECORD CHECK

The second major component of the Quality Assessment Study was to reconstruct the 1973 survey responses from departmental records for a sample of departments, and compare the resulting data with that which had been reported by the department. The procedure was designed to provide data that could be used to assess the accuracy of survey reporting.

Field team members visited the 30 institutions and 120 departments comprising the sample selected for the study. Field representatives compiled a listing of the graduate students and postdoctorates in each department and then recorded the same characteristic data used by the departments in compiling their survey responses.

Comparison of the data obtained from the department records by the field team members with that reported by the departments in the 1973 survey revealed a difference of only 1.2 percent in the total number of graduate students reported by the two sources. Also, the split between U.S. Government and non-U.S. Government sources showed close agreement, differing by only 0.8 and 2.0 percent, respectively. Differences in type of support, including fellowships and traineeships, research and teaching assistantships and other types of support, ranged from two to nine percent. In general, the larger categories of classification were observed to have the greatest consistency between departmental reports and field staff reports. All data resulting from the quality check are subject to substantial sampling error.

The experience gained in editing the survey questionnaires and conducting interviews with department personnel revealed that many respondents had difficulty completing their survey responses. This difficulty is attributed, in part, to the complexity of the survey form, which required pretabulated student counts. Response problems were also attributable to the fact that a respondent did not always have the required information available to him. The source of funds used for student support are not always known at the department level, and are frequently drawn from a pool of funds representing multiple sources. Another problem is encountered when asking for student counts tabulated by "major" source of income, in that department personnel may be aware of sources that are utilized by a given student if the funds are channeled through

the department. However, since they may not be aware of other sources used, such as student loans, family support, employment of spouse, G.I. Benefits, savings, etc., asking department personnel to report by major source of income creates a problem. This is particularly true in the case of larger departments where an individual student and his/her resources may be less well known to department personnel.

There was also evidence that some departments tend to report a student as receiving a fellowship or assistantship, regardless of the amount of income the student derives from that particular source.

STUDENT INTERVIEWS

The student characteristics data obtained from interviews conducted with the sample of graduate students and post-doctorals was compared with data extracted from department records. The interviews were designed to obtain the same student characteristics used by the departments in completing their 1973 survey responses so that the accuracy of the departments' records could be assessed, or their consistency with student perceptions determined.

The comparisons showed net differences of less than three percent on sex, citizenship, year-in-program, and type of support, and approximately five percent on source-of-support (U.S. Government vs. non-U.S. Government). Thus, most differences tend to "net out" in the comparison. Again, there is substantial sampling error in the comparisons.

A factor which contributed to the differences observed for type and source of support is the fact that funds used for student support frequently represent a mixture of both Federal and non-Federal. This can lead to mis-reporting by both the student and the department.

The 1973 survey responses contained student counts that were partially tabulated by type and source-of-support, and by year-in-program and/or citizenship. It was not possible to reconcile these data with the listings of students and their characteristics as compiled by the field representatives. Lack of the reconciliation step prohibits the identification of either data set as being the "correct" set. For this reason, it is possible to estimate response inconsistencies, not response errors.

Since the sample for the R&V Study was small, observed differences, even though large, were usually within the expected range of sampling error. A positive outcome of the study, however, is that observed inconsistencies may be used to identify response categories and definitions that may be troublesome.

Positive steps have been taken by the agencies in the 1974 survey to expand coverage and to simplify the questionnaire.